

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) IMPROVEMENTS RELATING TO FILTER PRESS PLATES OR TRAYS

- (71) We, PROGRESS ENGINEERS LIMITED, a British Company, of Progress House, Staffordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- This invention relates to filter press plates or trays, including also the frames, whether integral or separate, which may be associated with them.
- Typical forms of filter press plates or trays comprise a main flat portion which has a surrounding integral frame of greater thickness, and the main portion has surface configurations on both faces, for instance diagonal ridges, or a pattern of pyramidal or other projections, designed to hold the filter members or cloths away from the grooves or recesses in between the ridges or projections, so that liquid can more quickly drain away across the faces of the plates or trays and escape through drainage ducts or holes in the frames. In some cases the frames are separate and the plates or trays are held at the required spaced relationship with each other by fitting in between the separate frames at the perimeter.
- In dealing with certain difficult materials such as slurries containing solid particles of varying sizes, the conventional flat filter plate or tray is unsuitable, due to the fact that the filtration pressure is likely to vary over different parts of the plate or tray; for instance if the feed holes in the plates or trays become blocked or partly blocked, a very high pressure may develop locally against one face of a plate or tray, while a relatively low pressure prevails against the opposite face. In such circumstances an ordinary flat plate or tray will distort and may fracture.
- To meet these cases we have devised several special forms of filter press trays or plates. In the specification of patent No. 842,795 a tray has a surrounding drainage groove on each face of the tray close up to the frame, the groove on one face of the tray being arranged at a greater distance from the edge than the groove on the other face, so that the grooves are not in register with each other, and the thickness of the casting is not reduced to the same extent as it would be if the grooves on the opposite faces were in alignment. In the specification of patent No. 997,075 the main part of a tray is thickened at a position intermediate between the centre and the surrounding frame, the increased thickness being such as to still leave a clearance between one tray and the next through the zone of increased thickness when the trays are in their working positions. Other designs include areas of local thickening in the form of pyramidal projections with flattened apices, the thickness of the tray at these places approaching the thickness of the surrounding frame. In the specification of patent No. 998,421 the main area of the filter press tray is of spherical concave form on both faces, being of maximum thickness at its marginal parts and progressively tapering all round towards the centre.
- Plates or trays such as these, and indeed any press plate or tray having unequal thicknesses over different parts of its area, would be difficult to fabricate, and it is therefore desirable to form them as castings, usually although not necessarily of iron. Unfortunately cast iron plates or trays, repeatedly made wet and dry in the filter pressing operations, are highly susceptible to corrosion.
- According to the present invention a filter press plate or tray consists of a metal casting in the form of the complete plate or tray (including the brackets or the like by which it is to be supported on or suspended from the press girders), except that the two faces of the central area of the plate or tray are devoid of drainage configurations, and the casting has bonded to it and completely covering it on both faces respective layers of rubber or rubber-like material, in which the drainage configurations are formed.
- The invention also consists in a method of manufacturing a filter press plate or tray which comprises the steps of producing a complete metal casting in the shape of the eventual plate or tray save only that its faces are devoid of surface configurations for drainage purposes, applying to each face of

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the casting a layer of rubber or rubber-like material, and then subjecting the assembly to a bonding process under pressure between dies whose faces are contoured to produce drainage configurations in the rubber or rubber-like material, whereby the two faces of the casting become permanently covered by the corrosion-resistant layers of rubber or rubber-like material.

The covering layers are applicable to plates or trays having integral frames in which case the covering layers include the frames, and to those designed to be used with separate frames, in which case covering layers are applied to the separate frames also.

The bonding process may follow normal techniques using heat as well as pressure, with suitable reagents.

The expression "rubber or rubber-like material" is intended to cover natural and synthetic rubber and any suitable plastics.

The drainage configurations may be of any suitable design, for instance a pattern of pyramidal projections, with flattened or rounded apices.

The shape of the casting may be of any form suitable for withstanding unequal pressures, for instance as described and illustrated in any of the beforementioned prior patent specifications.

A constructional form of the invention will now be described with reference to the accompanying drawing which is a schematic exploded perspective view showing a filter press plate or tray casting and a rubber or rubber-like facing which is bonded on both faces of the casting.

The casting comprises a plate having an inner main area 1 with a feed hole 2 and an integral surrounding frame portion 3. Drainage holes 4 lead from the perimeter of the main area 1 and emerge on the outer surface of the frame portion 3. Brackets 5 extend upwardly by which the plate can be suspended from an overhead girder structure or runway. In some cases the brackets are arranged on each side of the plate to support it on side girders. There may be more than one feed hole 2. The plate is shown as of square shape but this again is not essential.

The faces of the plate including the faces of the frame portion 3 are covered by rubber or rubber-like coatings 20 which are formed with drainage configurations 21 shown as small separate projections, although diagonal grooves are more commonly used, and with holes 22 registering with those 4 in the plate. The internal faces of the ducts formed through the plate frame 3 by the holes 4 are also coated with the rubber or rubber-like

medium which forms a lining to the ducts as indicated in one case at 23.

Thus it will be seen that when the casting 1, 3 has bonded to it the rubber or rubber-like coating 20 the whole of it including the outer perimeter of the frame 3 is covered. The staybosses which appear on certain designs of the filter plate may also be covered.

WHAT WE CLAIM IS:—

1. A filter press plate or tray which consists of a metal casting in the form of the complete plate or tray (including the brackets or the like by which it is to be supported on or suspended from the press girders), except that the two faces of the central area of the plate or tray are devoid of drainage configurations, and the casting has bonded to it and completely covering it on both faces respective layers of rubber or rubber-like material, in which the drainage configurations are formed.

2. A filter press plate or tray as claimed in claim 1 having drainage holes at the perimeter which are also lined with the rubber or rubber-like material.

3. A filter press plate or tray as claimed in claim 1 or 2 having a surrounding frame portion integral with the central area thereof, and in which the surrounding frame portion is coated on both faces.

4. A filter press plate or tray as claimed in claim 1 or 2 having a separate surrounding frame portion which is coated on both faces.

5. Filter press plates constructed and arranged substantially as described with reference to the accompanying drawing.

6. A method of manufacturing a filter press plate or tray which comprises the steps of producing a complete metal casting in the shape of the eventual plate or tray save only that the two faces of its central area are devoid of surface configurations for drainage purposes, applying to each face of the casting a layer of rubber or rubber-like material, and then subjecting the assembly to a bonding process under pressure between dies whose faces are contoured to produce drainage configurations in the rubber or rubber-like material, whereby the two faces of the casting become permanently covered by the corrosion-resistant layers of rubber or rubber-like material.

7. Methods of manufacturing a filter press plate or tray substantially as described.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

